



SMART UTILITY SOLUTIONS FOR TELCOS



Measure | Manage | Evolve

INTRODUCTION

Our vision



- Joule Energy provides leading energy management solutions to all consumers of energy resources and utilities – technology agnostic – OEM aggregator.
- ISO 50001 Energy Management Implementation Experts
- Our name represents the fundamental of the energy market activity.
- We offer a tried-and-tested utility & asset energy bespoke software solutions.
- Specialist Measurement and Verification Services.

TELCO UTILITY CHALLENGES

Ongoing operational energy expenditure



- Energy spend for telecommunications entities, primarily Base Transceiver Stations (BTS) greatly impact on their ongoing operational expenditure, carbon footprint and operational budget.
- Energy bills for renting tower space to Telcos is often not communicated as a first-hand utility bill, but rather a landlord-letterhead bill.
- Most telcos focus on reducing rental fees as a point of decreasing opex.
- Telcos lose the ability to compare and manage electricity tariffs to the most advantageous tariff options when NERSA tariffs are updated annually.

TELCO UTILITY CHALLENGES

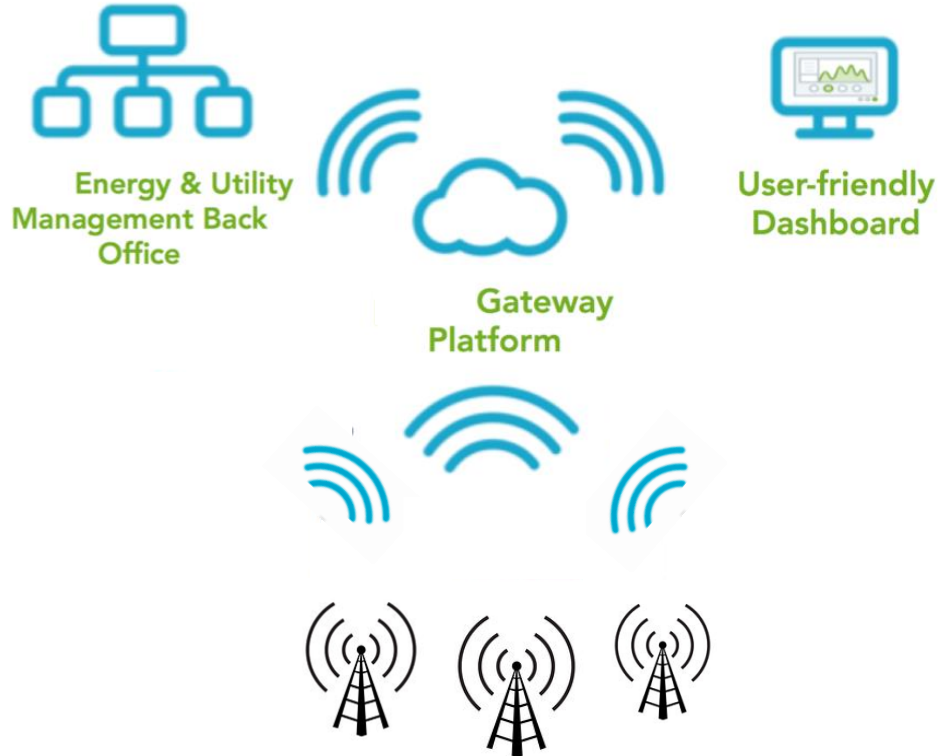
Carbon and sustainability reporting



- South Africa has committed itself at the Copenhagen climate conference to lower its carbon emissions by 42% by 2025.
- The potential financial impact of climate change-related laws and regulations extend to South Africa and the most immediate impact that we are likely to face in this respect is the risk of carbon taxes.
- This tax remains uncertain - it is still a tax that will have a high cost implication.
- Telco co-located sites that are not submetered would have to include the total site energy consumption to their carbon footprint.

SMART GATEWAY

Real-time granular data acquisition



ELECTRICITY MANAGEMENT

Data acquisition from existing sites



- The energy management platform bulk creates meters, account numbers and GIS locations.
- Identities such as main or submeters can be predetermined according to the telcos requirements.
- If a meter does not exist, manual utility accounts are used to create historical profile data.
- Historical kWh usage data can be imported, and the more granular that data, the more ways in which it can be used, this could be utilised to identify simple baseline metrics such as kWh/sqm.
- Baseline metrics and other drivers for energy site-spend could be used to compare optimal site usage via targeted energy waste profiles.
- Sites could then be optimised around asset value vs energy or carbon spend.

ELECTRICITY MANAGEMENT

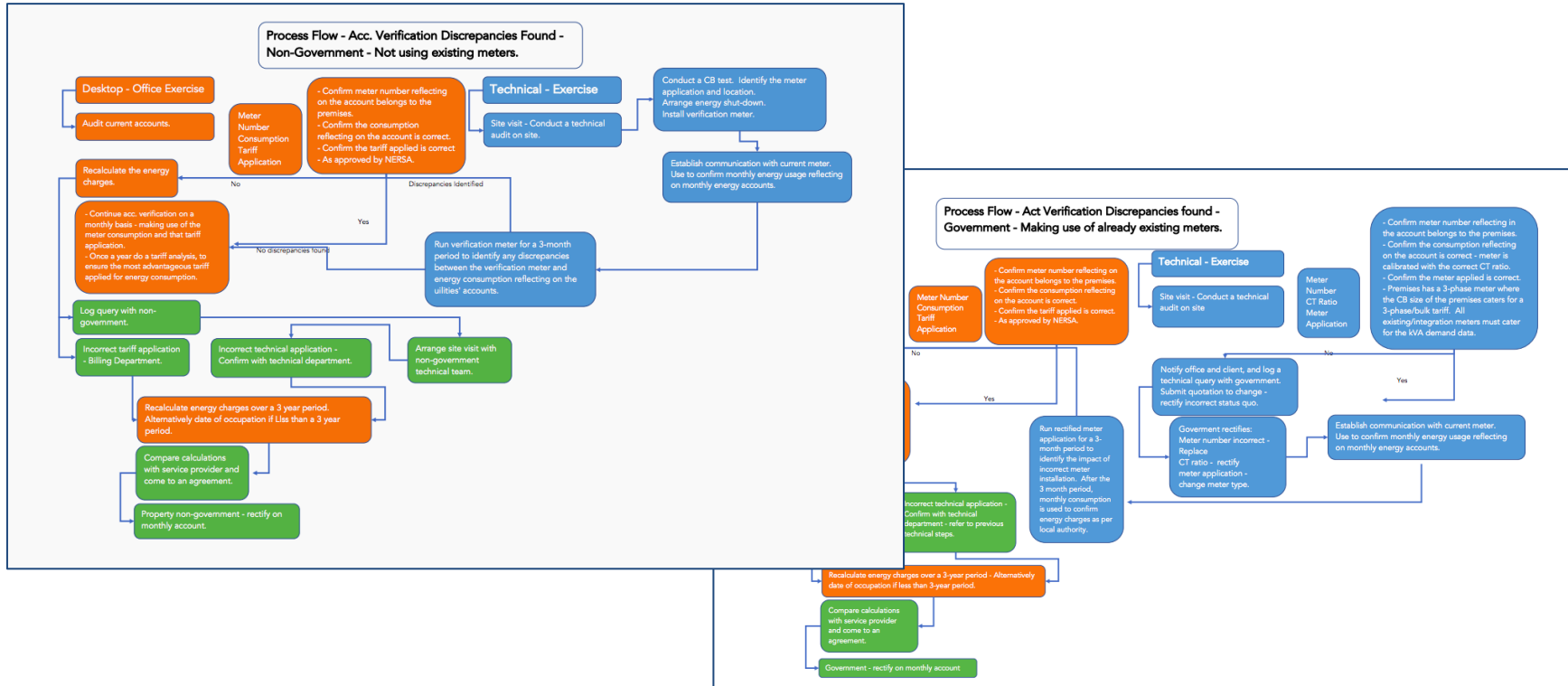
Bill verification process



- We employ a bill verification work process in this regard.
- Compare actual bills with provisional bills from our platform, as per installed meters.
- Consumption as read by the meter vs the consumption as reflecting on the actual account.
- Compare the tariff application on the account vs the correct tariff application as per NERSA.
- Once the values have been confirmed, the actual accounts from the Local Authority/Landlord then are approved for payment.
- The landlord/local authority is notified about the error in energy charges, and the applicable credits/debits are then requested.
- Alternative tariffs if applicable, as per NERSA.

ELECTRICITY MANAGEMENT

Bill verification process



UTILITY MANAGEMENT

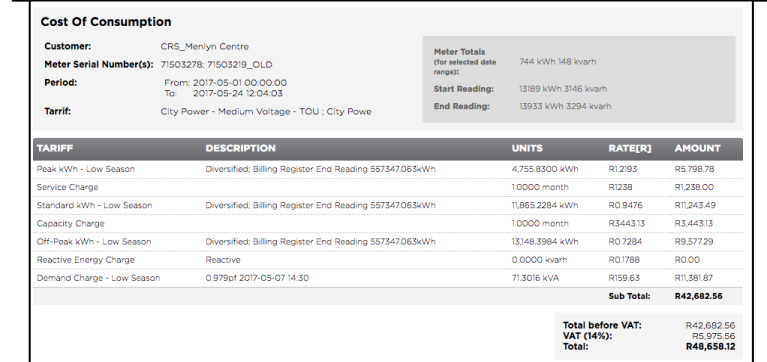
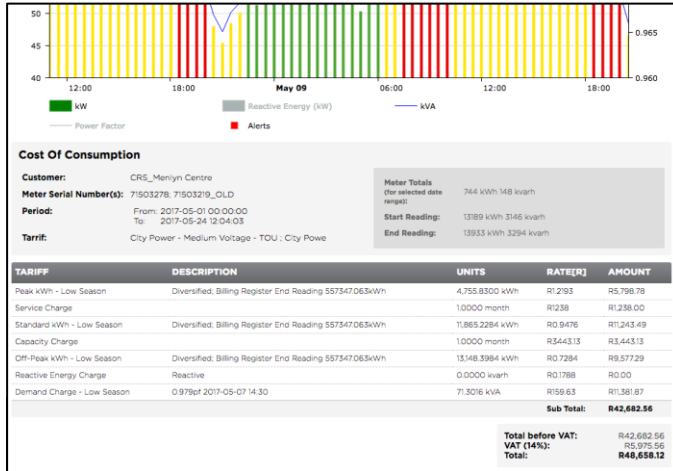
Proof of Value (PoV)



- In June 2016, we undertook the start of a PoV on a live BTS, deploying smart meters to meter the electricity on the main incomer, the main tenant and virtualized the other co-located telcos.
- The landlord site was located on a non-government site.
- A universal tariff engine was used as a proprietary solution, and as such is perfectly suited to the multi-municipal tariffing needs in the South African context, as well as most other territories.
- Real-time online portal via our gateway to monitor energy consumption and cost trends.
- We applied a three-year retrospective tariff analysis to showcase energy consumption and cost.
- The successful outcome of the PoV was that the landlord over-recovered for a period in question from the main tenant, i.e., the main tenants was being overcharged by the landlord.

ELECTRICITY MANAGEMENT

Electricity portal interface



GATEWAY

Granular real-time dashboard



The image displays two overlapping screenshots of the Gateway real-time dashboard. The background screenshot shows a login page with the following elements:

- Please Login** header
- Username field:
- Password field:
- Login** button
- Forgot Password?** and **Self Registration** buttons
- [Agreement policy](#) link

The foreground screenshot shows the usage analysis dashboard for account "Cell C and Bta" with meter serial numbers 2811304 and 2811303. The dashboard includes:

- Account:** Cell C and Bta
- Meter Serial Number(s):** 2811304, 2811303
- Utility Measured:** Electricity
- Tariff:** Mogale City_Commercial & Industrial - Bulk Consumers Low Voltage_Three Part
- Cost Of Consumption** section with Customer: Cell C and Bta and Meter Serial Number(s): 2811304, 2811303.
- JS chart by amCharts** showing kW (green bars) and Alerts (red squares) from Mar 08 to Mar 11.
- JS chart by amCharts** showing kW/kVA (green bars), Reactive Energy (kW) (grey bars), kVA (blue line), and Power Factor (grey line) from Mar 08 to Mar 11. The right y-axis for Power Factor ranges from 0.9965 to 1.0005.

UTILITY MANAGEMENT

Accurate energy spend



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total incl VAT
2014					start here		R3,718.95	R3,941.39	R4,092.66	R4,396.87	R4,264.93	R4,411.93	R24,826.73
2015	R4,955.89	R4,325.90	R4,719.97	R4,492.89			R3,867.64	R4,101.25	R4,257.05	R4,567.27	R4,432.92	R4,580.42	R44,301.20
2016	R5,174.47	R4,496.45	R4,894.61	R4,665.56			R4,163.12	R4,414.58	R4,582.29	R4,916.20	R4,771.59	R4,930.37	R47,009.24
2017	R5,569.80	R4,839.98	R5,268.54	R5,022.00	end here								R20,700.32
Grand total													R136,837.49

Tariff Item:	2014-07-01 to 2015-07-01	2015-07-01 to 2016-07-01	2016-07-01 to 2017-07-01
Demand Charge	R 80.61	R 92.91	R 100.01
Energy Charge (kWh)	R 0.7787	R 0.7841	R 0.844
Reactive Energy Charge	R 0.1629	R 0.1828	R 0.1968
Service Charge	R 435.92	R 489.1	R 526.47

Set

REPORTING

The sustainability-energy nexus



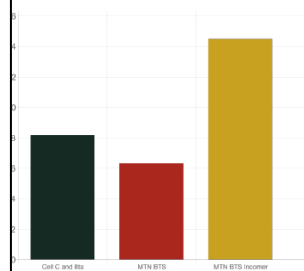
BTS Sustainability Report

1 April 2017 - 1 May 2017

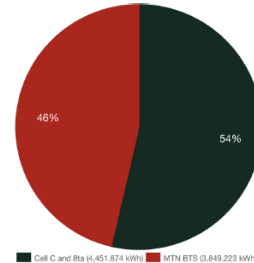
Summary

Site	Consumption	CO2	H2O	SO	NO
MTN BTS Incomer	8,301.097 kWh	8.193 (tons)	10.459 (kl)	0.066 (tons)	0.03 (tons)
Cell C and 8ta	4,451.874 kWh	4.394 (tons)	5.609 (kl)	0.035 (tons)	0.016 (tons)
MTN BTS	3,849.223 kWh	3.799 (tons)	4.85 (kl)	0.03 (tons)	0.014 (tons)

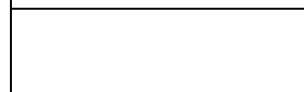
Peak Demand (kVA) Comparison



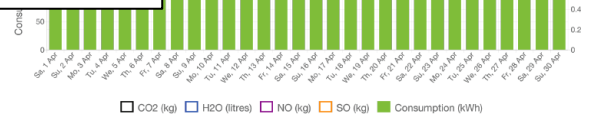
Site Breakdown



Load Factor (%) Comparison



kWh Losses



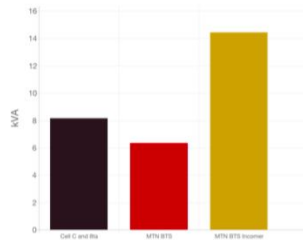
BTS Monthly Report

1 March 2017 - 1 April 2017

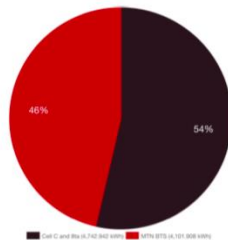
Summary

Name	Consumption	Peak Demand	Bill Total
MTN BTS Incomer	8,844.849 kWh	14.434 kVA	R 9,433.664
Cell C and 8ta	4,742.942 kWh	8.152 kVA	R 5,344.728
MTN BTS	4,101.908 kWh	6.353 kVA	R 4,621.543

Peak Demand (kVA) Comparison



Site Breakdown



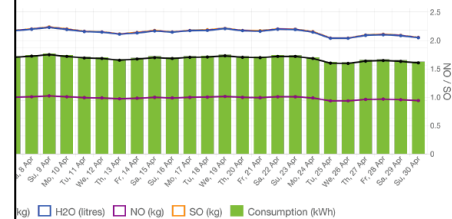
Load Factor (%) Comparison



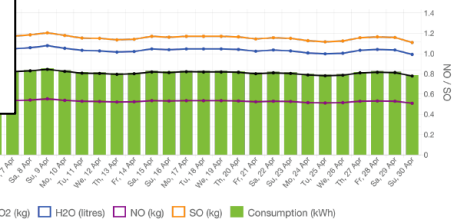
kWh Losses



Load Factor: 79.481%



Load Factor: 75.472%



REPORTING

Benefits



- Time Of Use (TOU) tariffs, Maximum Demand charges, Notified Maximum Demand, Step tariffs, recurring flat fees, reactive energy/poor power factor penalty charges.
- The ability to charge co-located tenants the correct electricity spend.
- An audited smart metering trail to claw back from landlords [private/public].
- The ability to report and monitor key performance indices such as excessive use for sites - business rules.
- The ability to accurately determine energy spend and carbon footprint.
- The ability to check variables that affect energy performance and ultimately budget for energy spend provided variables are monitored.
- The tools to monitor energy efficiency initiatives and impacts.
- The ability to accurately design demand and alternative energy source equipment.
- Contracts between the lessor and lessee needs to be drafted correctly



**Let us improve your
smart energy
advantage!**

Measure | Manager | Evolve